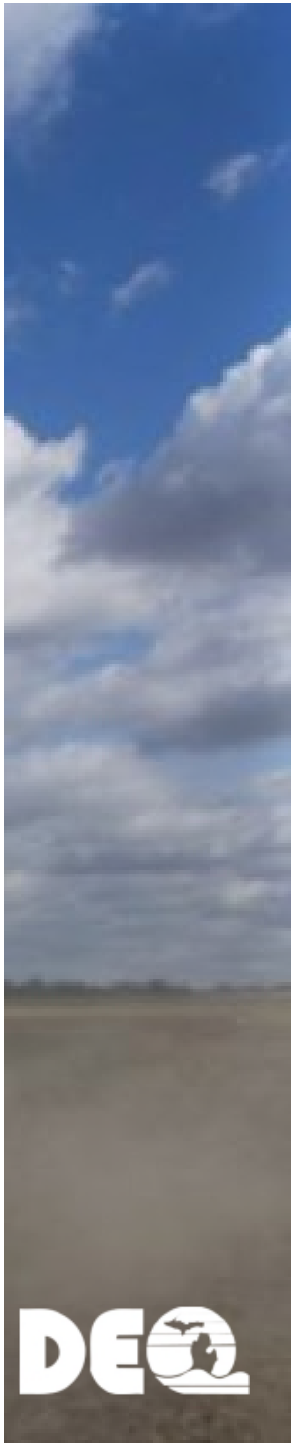


Fugitive Dust Management

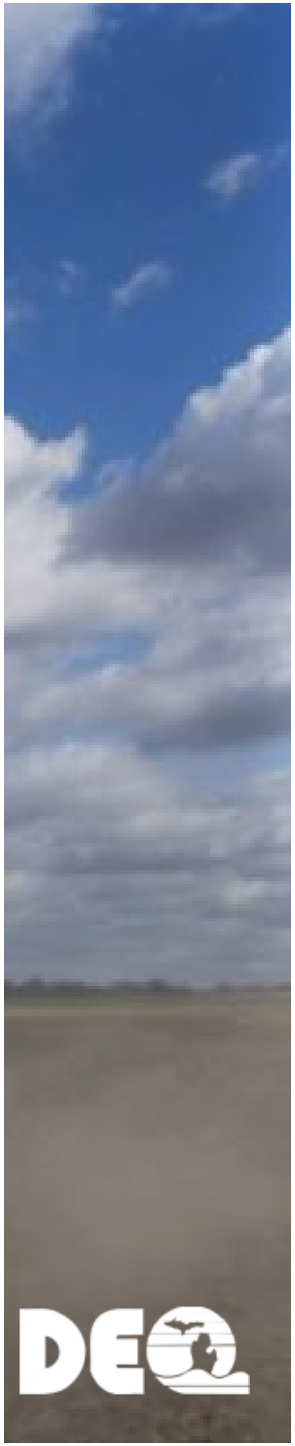
Nazaret Sandoval

Michigan Department of Environmental Quality

AQD - Detroit Field Office

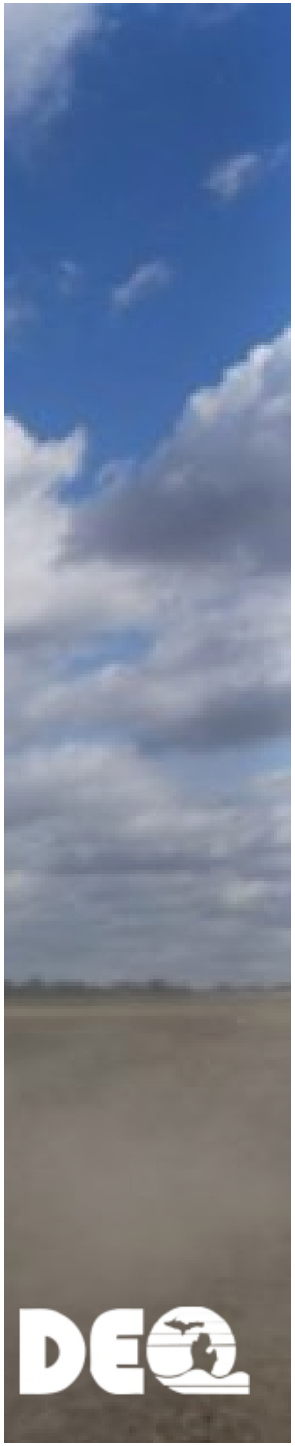
313-456-4680

sandovalc@michigan.gov



Outline

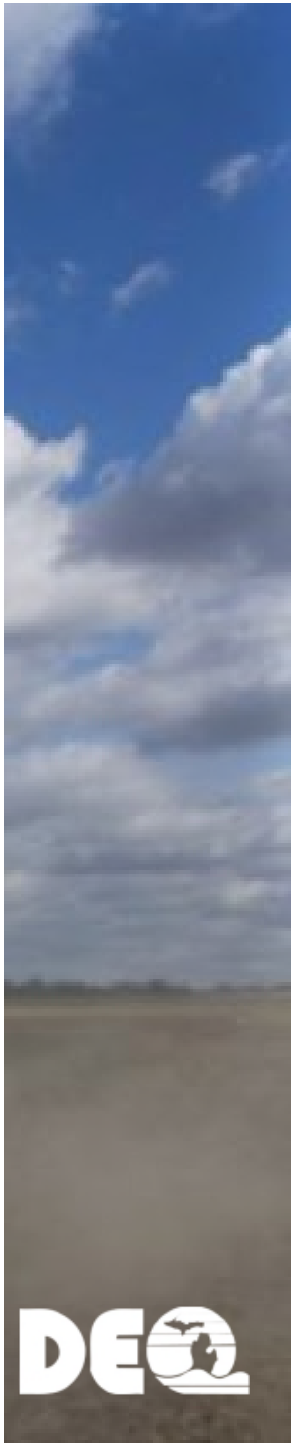
- Fugitive Dust Control Program: Definition and Benefits
- Potential Sources of Fugitive Dust
- Control Measures to Mitigate Dust at Site Specific Activities
- Developing and Implementing a Cost-effective Fugitive Dust Control Program
- Conclusions



Fugitive Dust Control Program

Definition:

“A fugitive dust control program is an operating program that is designed to significantly reduce the fugitive dust emissions to the lowest level that a particular source is capable of achieving by the application of control technology that is reasonably available, based on technological and economic feasibility”



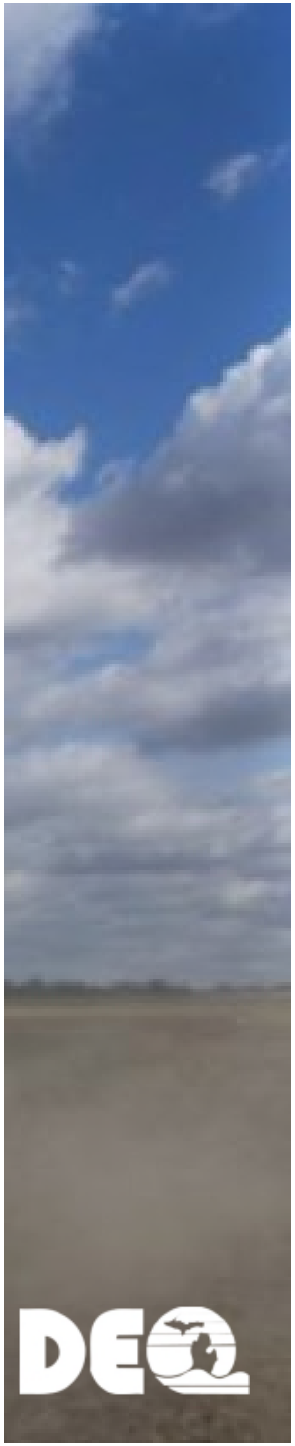
Benefits of Effective Dust Management

To the Environment

- Reduction in air pollution
- Reduction in water pollution
- Fewer disturbances to existing flora and fauna habitats

To the Neighbors and Community

- Reduction of health risks resulting from air pollution
- Reduced risk of damage to property and belongings



Benefits of Effective Dust Management

To the Owner of the Facility

- Conservation of material
- Reduced risk of damage to property and equipment.
- Improved relationships with neighbors and with regulatory authorities
- Better working conditions for staff
- Enhanced business reputation
- Knowledge of contribution to environmental protection in compliance with the law

Fugitive Dust Control

Rule 371: Fugitive dust control programs other than areas listed in Table 36

AQD may request a person who is responsible for the operation of any facility which processes, uses, stores, transports, or conveys bulk materials submit a fugitive dust control program

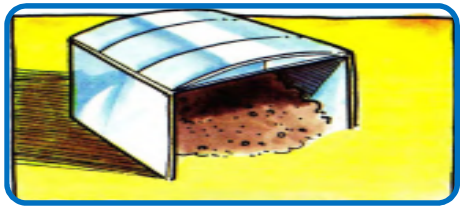
Fugitive Dust Sources

Rule 372: Fugitive dust control program; required activities; typical control methods

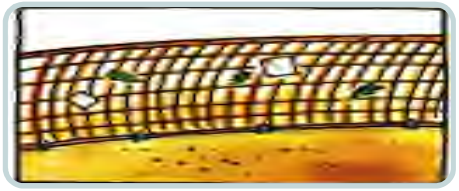
Storage Piles

Minimize drop heights. Use pneumatic conveyors. Remove Spills

Spray piles with water or dust suppressant compound



Enclose or cover the piles if frequently loaded and unloaded .



Limit dusty work of windy days. Use wind erosion controls.

Typical Dust Management Measures

COVER STORY

PET COKE: Pile storage flap shifts to River Rouge site

FROM PAGE 1A

off the four-story-tall pet coke piles that coated homes, cars and lungs. Nearby factories at the River Rouge site include U.S. Steel, a DTE power plant and various facilities on nearby Zug Island.

But the new site also features residential neighborhoods less than a half-mile away, and River Rouge's popular Belanger Park on the riverfront is only about a quarter-mile away.

Harry Marx and Bob Griggs grew up nearby in Wyandotte and said they have recreated on this stretch of the Detroit River all their lives. Both said they remember last year's clashes over the pet coke piles in Detroit, and they don't welcome that coming to their neighborhood.

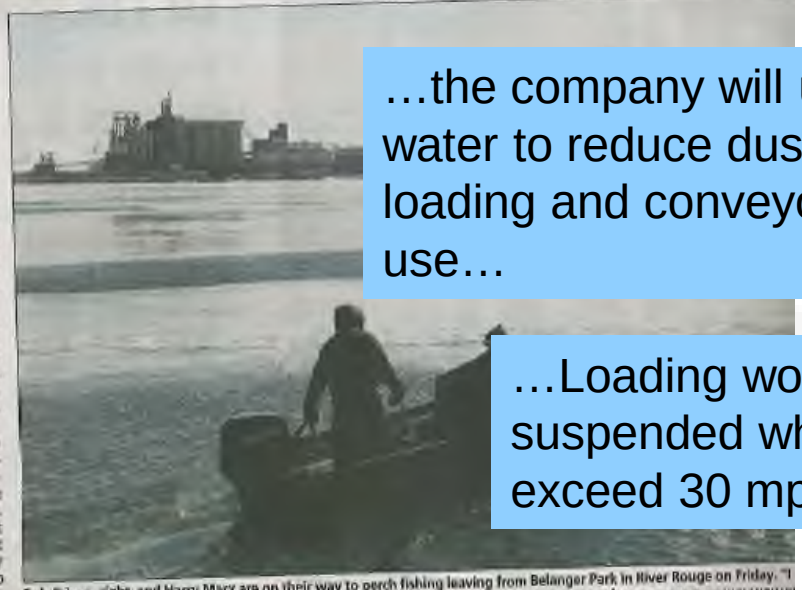
"I don't want that at all," said Marx, 51, as he and Griggs launched a boat from Belanger Park for some chilly perch fishing Friday. "That dust blowing into the water? The river is finally coming back."

Added Griggs, 52, "We have one of the best walleye fisheries here. And look at all those birds," he said, sweeping his arm toward a huge flock of nearby Canada geese, swans and an occasional bald eagle.

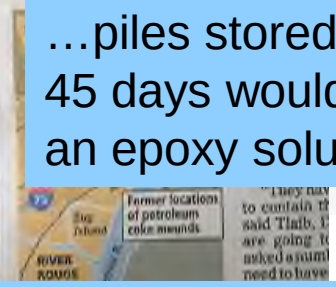
"If that stuff gets on the water, they and the fish will ingest it. And what happens if it makes it to the bottom of the river?"

Detroit Bulk Storage Vice President Noel Frye said the company has long used the parcel, storing materials such as limestone, salt and trap rock. It also stored petroleum coke there for a few years in the early to mid-2000s, he said, until its customer at the time, Holcim Cement, closed its plant in Dundee around 2009.

"I haven't had a complaint on that facility, as far as environmental goes, in all the time that we've been there," he said. "We've been there for 30 years and most people don't even know we exist down there."



Bob Griggs, right, and Harry Marx are on their way to perch fishing leaving from Belanger Park in River Rouge on Friday. "I opposed to this," says Marx about Detroit Bulk Storage wanting to store petroleum coke nearby. PHOTOS BY ROMAIN BLANQUART



Detroit Bulk Storage has applied for a permit with the Mi Department of Environmental Quality to store petroleum coke) at its headquarters in River Rouge. A formal hearing held on the permit request this spring.

ery that is used as a relatively dirty-burning fuel. The local pet coke piles come from Marathon's Detroit refinery, which completed a four-year, $2.2-billion expansion in 2012 allowing it to process heavy crude piped here from western Canada. The refinery's new coker generates about 600,000 tons

the river last year b Koch Carbon shipped back to Ca on the East Coast at a power plant in Nova Scotia, Frye said.

Frye said the company would have piles up to 30 feet at the River Rouge site, and would ship about 300,000 tons "of a whole bunch of different

between trucks and river barges. Loading would be suspended when winds exceed 30 m.p.h. or gusts of 45 m.p.h.

The coke piles stored for more than 45 days would be sealed with an epoxy solution,

River on edged that on all sides that should allow the said.

…the company will use sprayed water to reduce dust during loading and conveyor belt use…

…Loading would be suspended when winds exceed 30 mph…

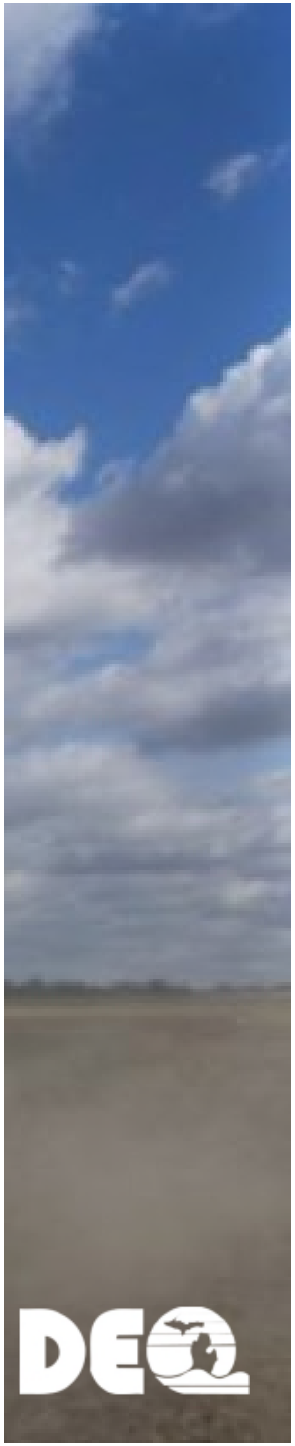
…piles stored for more than 45 days would be sealed with an epoxy solution…

…piles stored longer than 150 days would be covered with a tarp…

Storage Piles

There will be instances when most of the dust control measures fail and the only solution is…

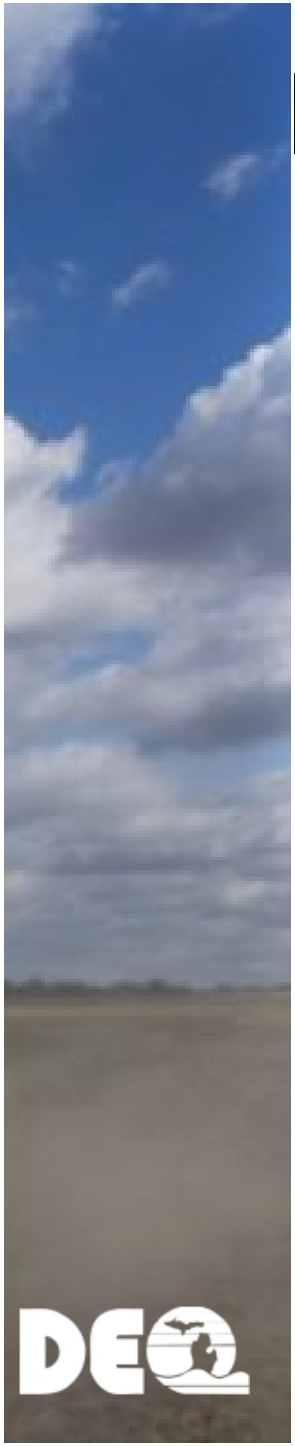
…to remove the source of the dust. The piles were removed from open storage and total enclosure was recommended.



Detroit considers tougher rules for pet coke

The Detroit News - April 12, 2016

- The city is weighing a measure that would strictly regulate the handling of petroleum coke and other bulk solid materials to protect the health of its most vulnerable residents.
- The ordinance proposed amendments to Chapter 22 of the 1984 Detroit City Code



Dust Suppressants: Water and Chemical Stabilizers

Watering

- Typically cheapest dust control method
- Only provides temporary control
- Weather conditions dictate reapplication frequency

Watering (cont.)

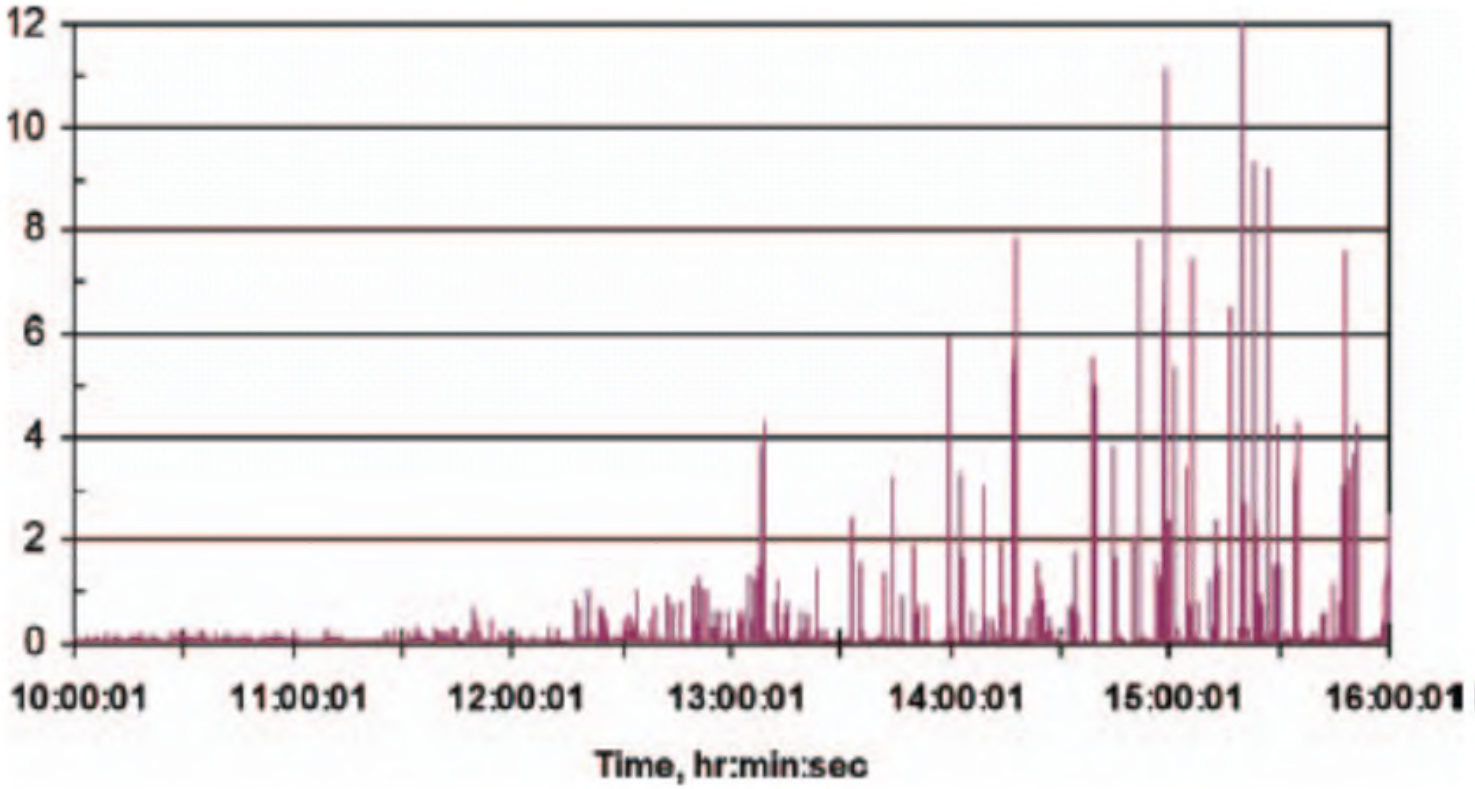
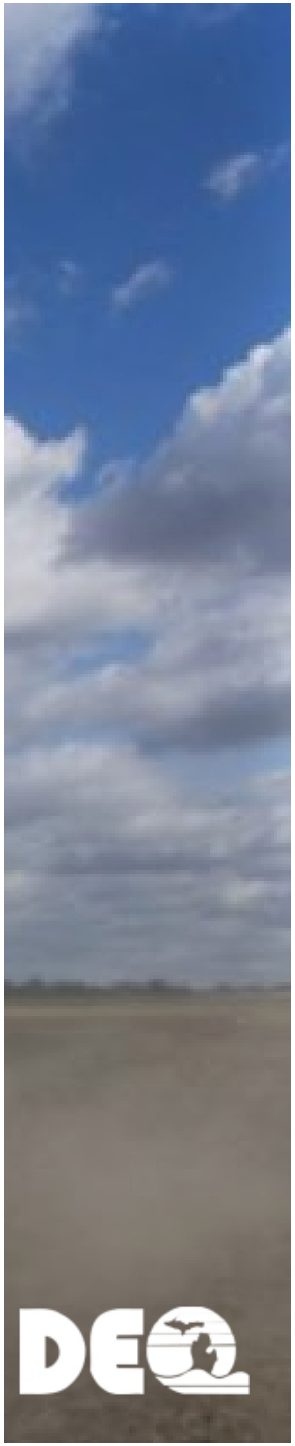


Figure 1—Instantaneous dust concentrations from haul trucks on test section of road as it is initially wetted and allowed to dry.

Effective Watering

Watering – less effective method

Watering controlling dust, but not runoff



Common Dust Suppressants

Permitted to be Discharged without Permit
Water Resources Protection
Part 22 - Groundwater Quality

Authorized per Rule 2210(b):

- Water
- Calcium Chloride
- Lignin (pulp/paper by-product)
- Vegetable-based products
- Polymer solutions
- Emulsified asphalt or resin stabilizers

Non-water Dust Suppressants

- Follow the manufacturer's specifications or other tested and approved procedures.
- The application shall be limited to the roadway, driveway or parking lot. Only UNPAVED roads
- Carefully monitor the application rate to ensure adequate coverage without pooling or runoff of products

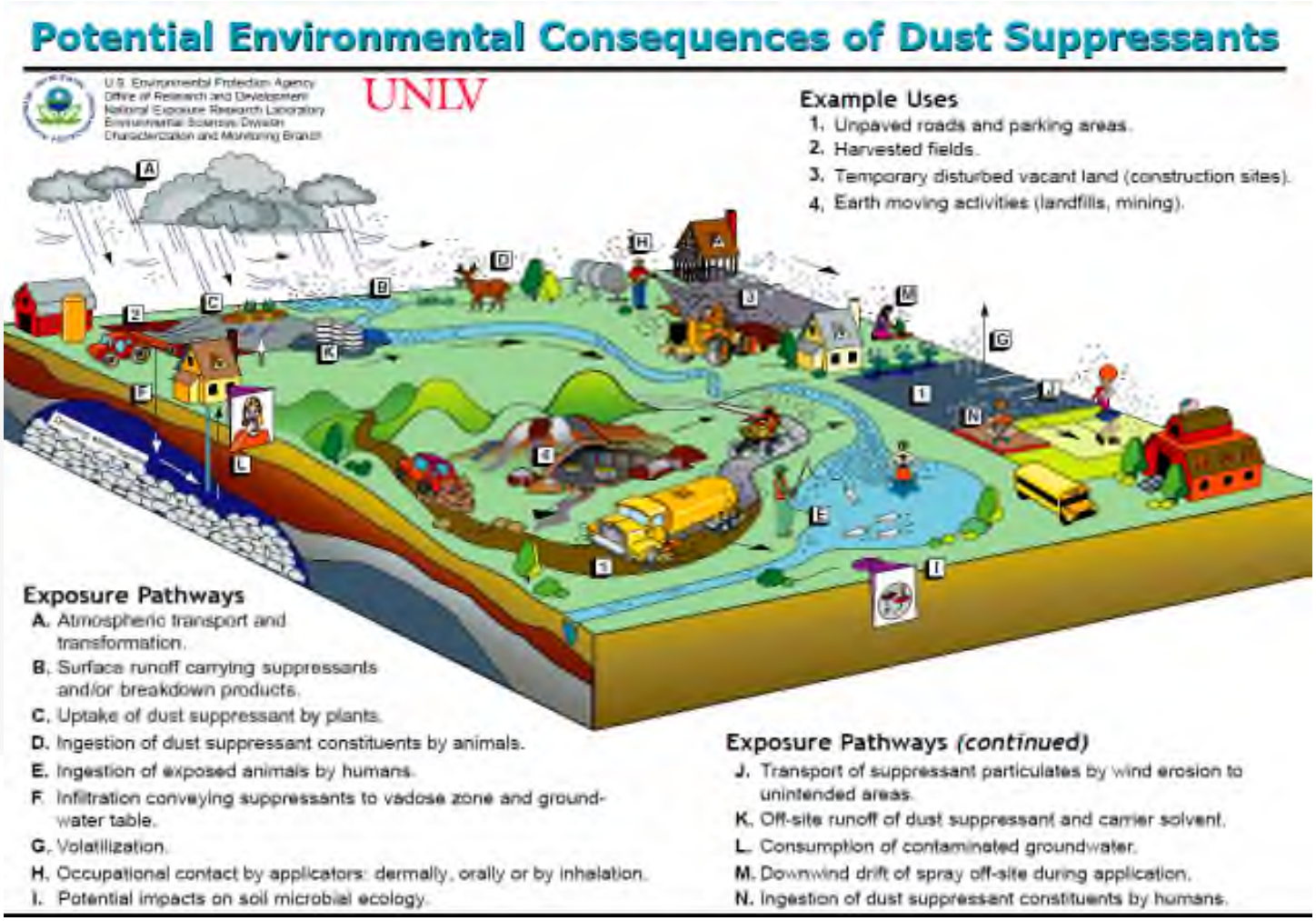
Non-water Dust Suppressants

Products must be incorporated into the road immediately upon application to ensure the product does not migrate off the roadway.

Ensure that dust suppressants do not enter and contaminate waterbodies, including surface water and groundwater.

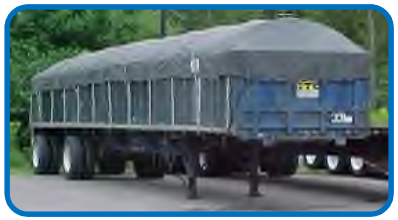
Do not apply products to areas of roads that are subject to flooding.

Use Approved Dust Suppressants



<u>Source:</u> Potential Environmental Impact of Dust Suppressants "Avoiding Another Times Beach" - An Expert Panel Summary – Las Vegas, Nevada - May 30 -31, 2002

Loading / Transporting Bulk Material



Completely cover open-bodied trucks or use enclosed trucks

Cleaning the wheels & the body of the truck after the truck has been loaded & before leaving the site.

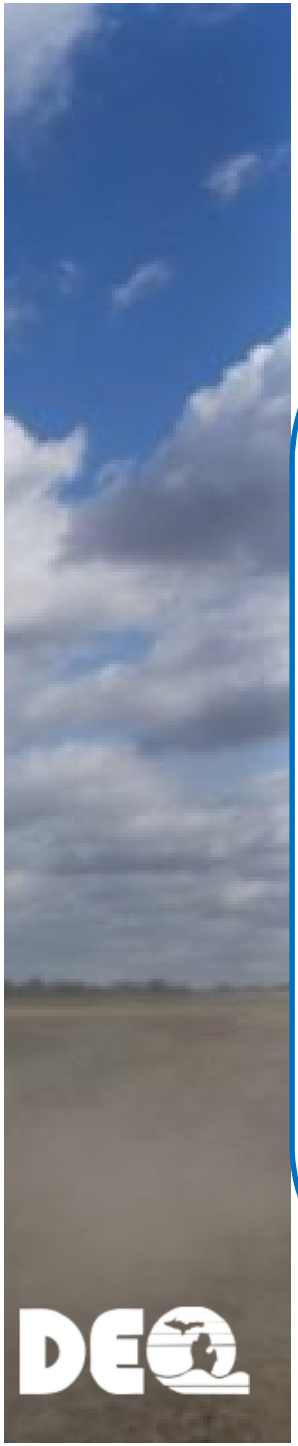
The load shall be at least 6 inches below the sideboard, side panel, or tailgate

Maintain vehicles to prevent leakage or spillage. Do not overload. Empty bucket slowly.

Typical Dust Management Measures

A little humor !

Dust Management for Conveyors



Conveyors

Dust Management Measures

- Completely enclose all conveyor belts and provide them with belt wipers
- Enclose transfer points and, if necessary, exhaust them to a control device all times when conveyor is in operation
- Restrict the speed of the conveyor belt
- Use telescopic chutes
- Limit drop height . Clean spilled material from the ground under conveyor.

On-site Roadways and Yard

Typical Dust Management Methods

Pave haul roads / lot with concrete, asphalt or equivalent (at least entrance and exit)

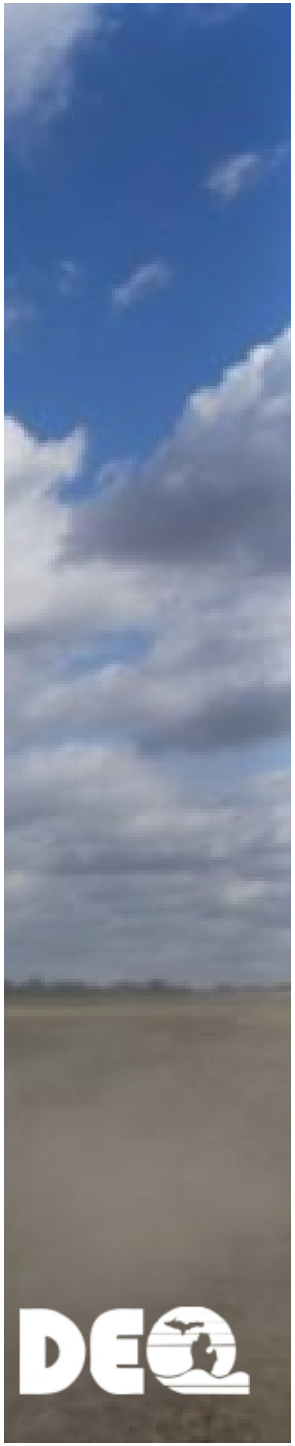
Frequent mechanical cleaning of paved surfaces (vacuum sweeping, wet sweeping, or flushing)

Apply dust suppressants. Several applications per day may be necessary

Reduce vehicle speed on unpaved roads to 10 mph or less

Periodically maintain off-road surfaces with gravel/stone where trucks have frequent access

Ineffective Application of Dust Mitigation Methods



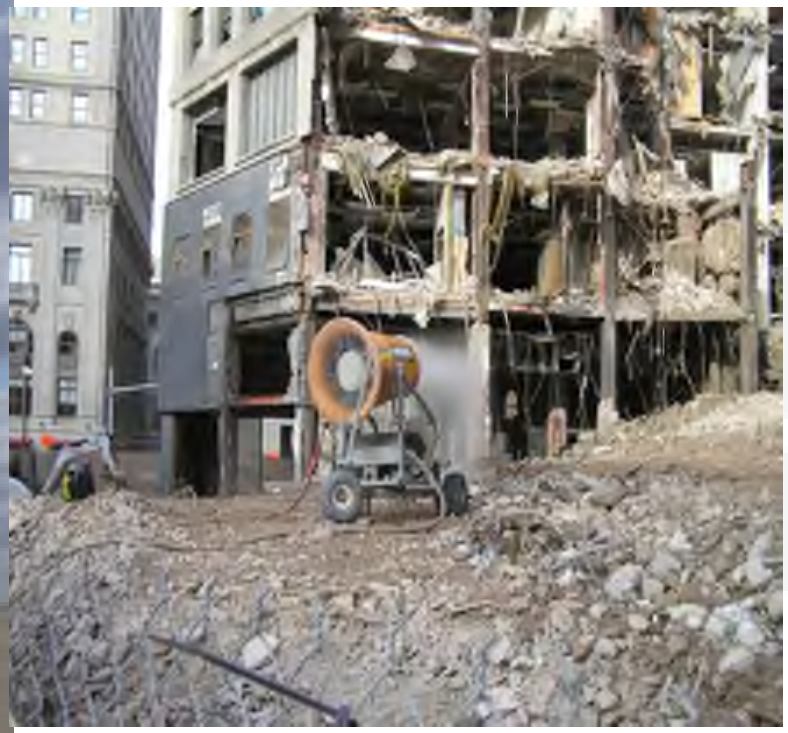
Building Openings

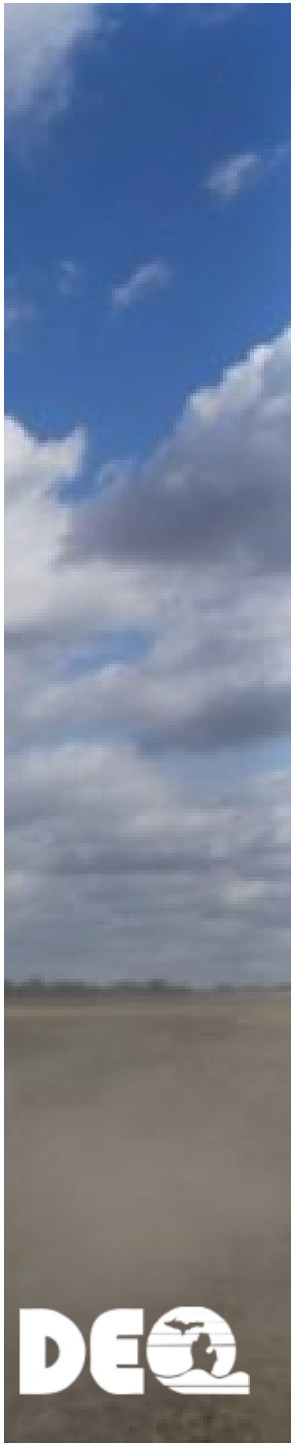
(roof monitors, ventilators, doors, windows, etc.)

Dust Management Measures

- Exhaust the entire building to dust collection system
- Use local hoods connected to a dust collection system to capture emissions within the building
- Establish and maintain operating procedures and internal housekeeping practices (specify details)
- Install removable filter media across the vent openings

Construction and Demolition activities





Construction / Demolitions & Earth Moving Activities

Dust Management Measures

- Conduct activity on less windy days
- Reduce wind effects with windbreaks where practicable
- Require tarpaulins for all haul vehicles
- Spray all work areas with water and dust-suppressant compound approved by AQD / DEQ
- Completely cover the debris, excavated earth, or other airborne materials with tarpaulin or other approved material

Trackout

Driveways

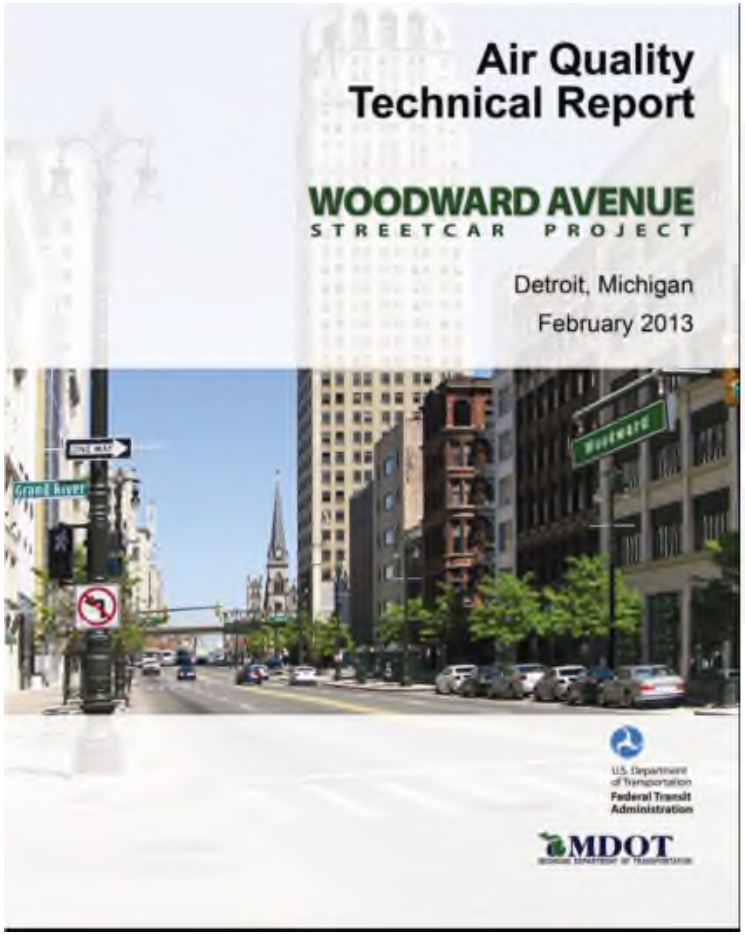
Rumble strips knocks dirt and dust from wheels preventing track-out

At the entrance/exit of the Site

Fugitive Dust Control

Street Sweeping

M-1 RAIL Construction



M-1 Rail Construction Fugitive Dust Mitigation

3.5.1 Fugitive Dust Emissions

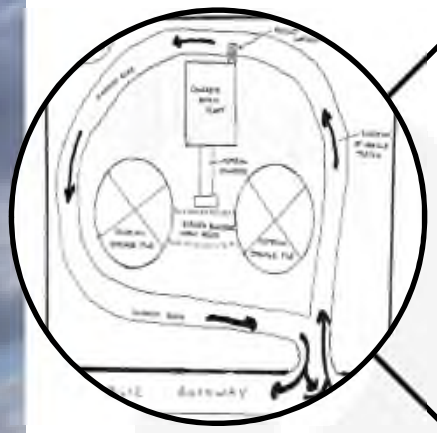
Fugitive dust is airborne particulate matter, generally of a relatively large particulate size. Construction-related fugitive dust would be generated by haul trucks, concrete trucks, delivery trucks, and earth-moving vehicles operating around the construction sites. This fugitive dust would be due primarily to particulate matter re-suspended ("kicked up") by vehicle movement over paved and unpaved roads, dirt tracked onto paved surfaces from unpaved areas at access points, and material blown from uncovered haul trucks.

Generally, the distance that particles drift from their source depends on their size, the emission height, and the wind speed. Small particles (30 – 100 micron range) can travel several hundred feet before settling to the ground. Most fugitive dust, however, is comprised of relatively large particles (that is, particles greater than 100 microns in diameter). These particles are responsible for the reduced visibility often associated with this type of construction. Given their relatively large size, these particles tend to settle within 20 to 30 feet of their source.

In order to minimize the amount of construction dust generated, the guidelines below should be followed. The following preventive and mitigative measures should be taken to minimize the potential particulate pollution problem:

- Site Preparation
  - Minimize land disturbance.
  - Use watering trucks to minimize dust.
  - Cover trucks when hauling dirt.
  - Stabilize the surface of dirt piles if they are not removed immediately.
  - Use windbreaks to prevent accidental dust pollution.
  - Limit vehicular paths and stabilize these temporary roads.
  - Pave all unpaved construction roads and parking areas to road grade for a length no less than 50 feet from where such roads and parking areas exit the construction site. This prevents dirt from washing onto paved roadways.
- Construction
  - Cover trucks when transferring materials.
  - Use dust suppressants on unpaved traveled paths.
  - Minimize unnecessary vehicular and machinery activities.
  - Minimize dirt track-out by washing or cleaning trucks before leaving the construction site. An alternative to this strategy is to pave a few hundred feet of the exit road just before entering the public road.
- Post-Construction
  - Re-vegetate any disturbed land not used.
  - Remove unused material.
  - Remove dirt piles.
  - Re-vegetate all vehicular paths created during construction to avoid future off-road vehicular activities.

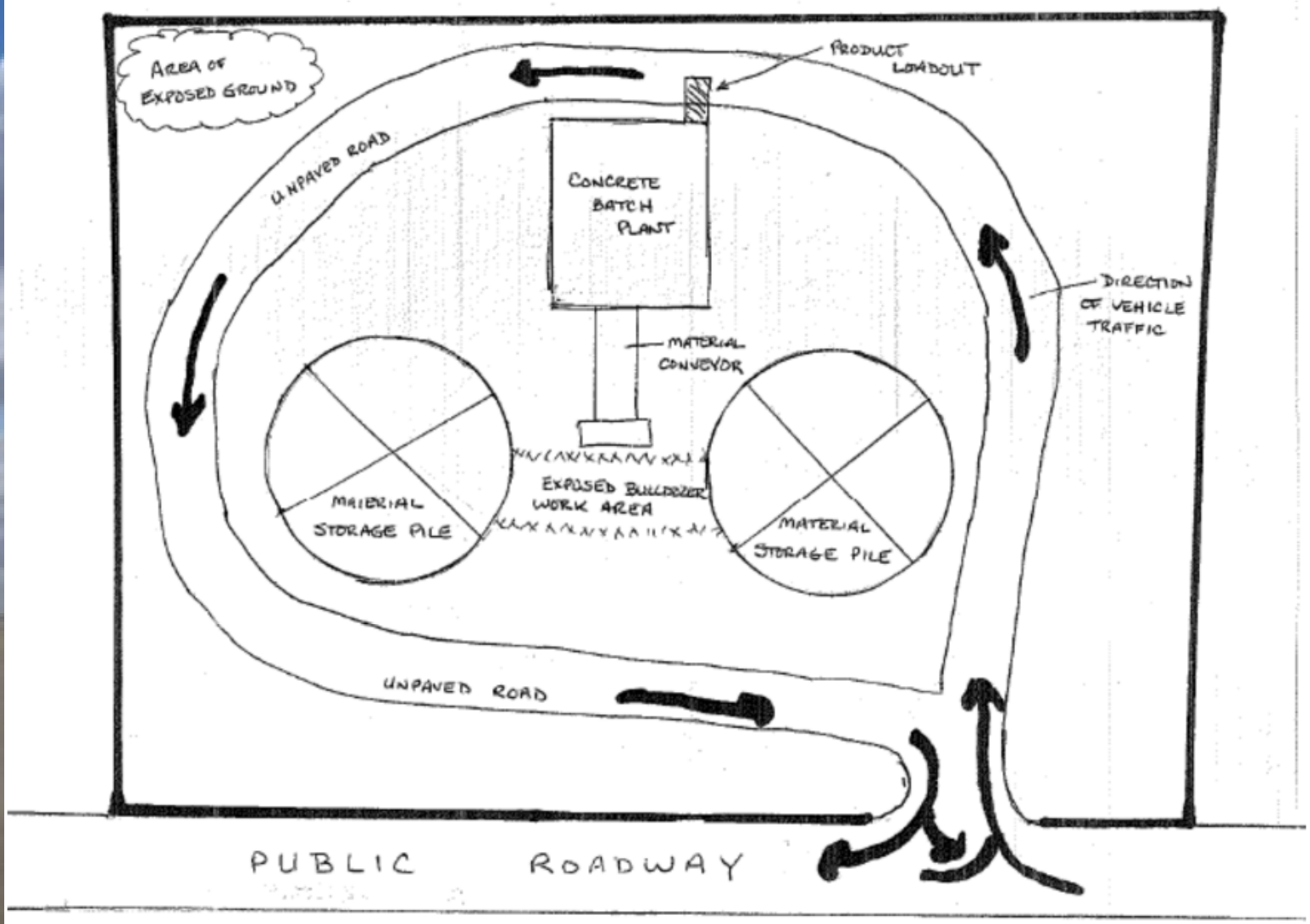
Steps to develop a Fugitive Dust Control Plan



Start With a Facility Site Plan Map
Identify all potential sources of Fugitive Dust. Record all roads, staging areas, parking lots, and other open areas subject to wind erosion.

Study the Daily Traffic Volumes and patterns on the roads and open areas. Determine whether they are used frequently or occasionally.

Facility Map



Steps to develop a Fugitive Dust Control Plan

Assign Dust Control Methods consider: quantity, moisture content, particle size distribution and how frequently the surface in an area is disturbed.

Frequency of Applications Calculate how often any periodic dust control treatment must be applied and establish an schedule for the applications

Cost-Benefit Evaluation

Table A–3 Fugitive Dust Mitigation Measures (PM10), Effectiveness and Cost

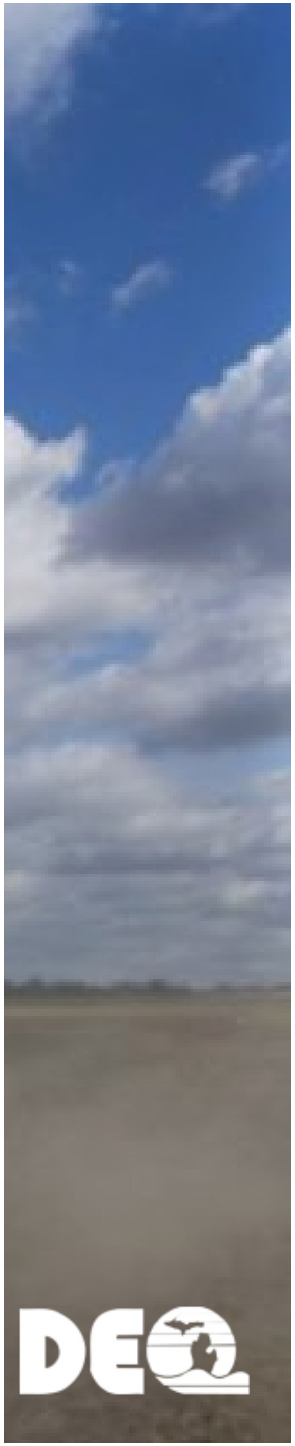
	Dust Sources					
	Disturbed Areas			Unpaved Roads[1]		
Mitigation Options	Establish plant cover for all disturbed lands by certain time (re-vegetation)	Water roads to attain certain percent moisture[2]	Apply soil stabilizer	Set and enforce speed limit	Gravel roads	Paved road
Effectiveness	Level proportional to percentage of land cover	0 – 50% reduction in uncontrolled dust emissions	33 to 100% control efficiency	80% for 15 mph 65% for 20 mph 25% for 30 mph[3]	30% reduction	90% reduction
Estimated Cost	$/acre	$4000/mile	$2,000 to $4,000/mile per year	Unknown	$9,000/mile	$11,000 to $60,000/mile

Note:
1. Improved and County roads
2. Wetting of construction roads during the construction period. Wetting of construction roads not required for once a month maintenance trips to well pads.
3. Reductions assume 40 mile per hour base speed.

Implement the Control Plan

Create a Self-Inspection Checklist Record all dust control activities and log daily weather information (average wind speed and direction, temperature, rainfall, etc.)

Records shall be maintained for five years and be available for review by the inspector from AQD/DEQ

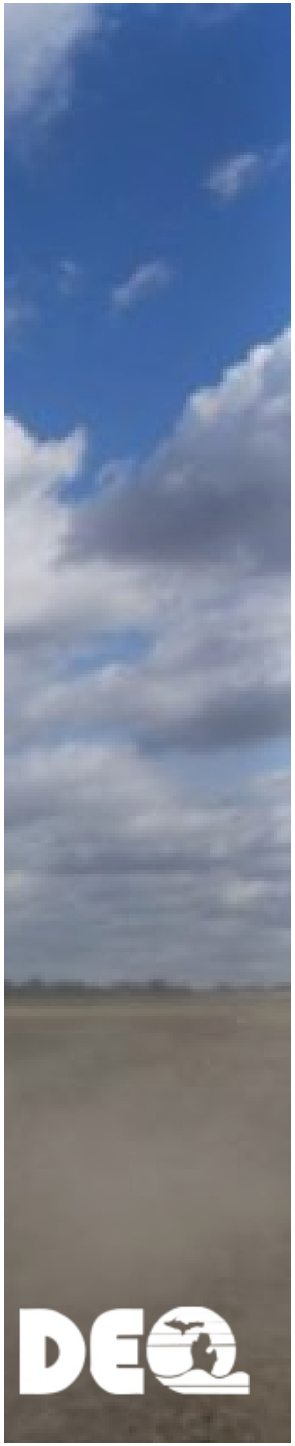


Record Dust Control Activities

Daily Record of Fugitive Dust Control Mechanisms		
Location:	Warren Plant	
Date:	7/10/15	
Weather Conditions:	Dry	
Temperature:	67	
Wind Direction:	2 mph SSE	
Vehicle speed limit: 4 miles per hour		
Fugitive Dust Source	**Type of Fugitive Dust Control**	**Frequency**
Paved Roads	Water Flushing Yes ☐ No ■ Water Sweeping Yes ☐ No ■ Water Spraying Yes ■ No ☐	Circle the frequency: None 1 2 3 4 Time: 9am & 3pm
Paved Lots	Water Flushing Yes ☐ No ■ Water Sweeping Yes ☐ No ■ Water Spraying Yes ☐ No ■	Circle the frequency: None 1 2 3 4 Time:
Storage Piles	Water Flushing Yes ☐ No ■ Water Sweeping Yes ☐ No ■ Water Spraying Yes ■ No ☐	Circle the frequency: None 1 2 3 4 Time: All day
Vehicle Track-out	Water Flushing Yes ☐ No ■ Water Sweeping Yes ■ No ☐ Water Spraying Yes ☐ No ■	Circle the frequency: None (1) 2 3 4 Time: 3 P
Spilled Material	Water Flushing Yes ☐ No ■ Water Sweeping Yes ☐ No ■ Water Spraying Yes ☐ No ■	Circle the frequency: None 1 2 3 4 Time:
Unpaved Roads & Lots	Water Flushing Yes ☐ No ■ Water Sweeping Yes ☐ No ■ Water Spraying Yes ■ No ☐	Circle the frequency: None 1 (2) 3 4 Time: 9am & 3pm
Miscellaneous Fugitive Dust Control Activities		

Source	Hours of Operation	Production Rate (Yds³/Day)
Truck Mixed Concrete Batch Plant	5am – 7pm	1023.75

Signature



Self-Inspection Checklist

Using a Self-Inspection Checklist helps you incorporate the routine tasks of fugitive dust control into your daily schedule. It serves as a job reminder on a daily basis, and as a record of your efforts to keep dust problems to a minimum. You can identify problem areas before they get out of hand, and anticipate making adjustments for seasonal changes or for any unforseen circumstances. **Your personal involvement in reducing fugitive dust will help us all breathe a little easier!**

Prevention

- ✓ Limit Surface Area Disturbed
- ✓ Limit Work in Wind
- ✓ Apply Suppressives as Needed
- ✓ Clean up Spills Immediately

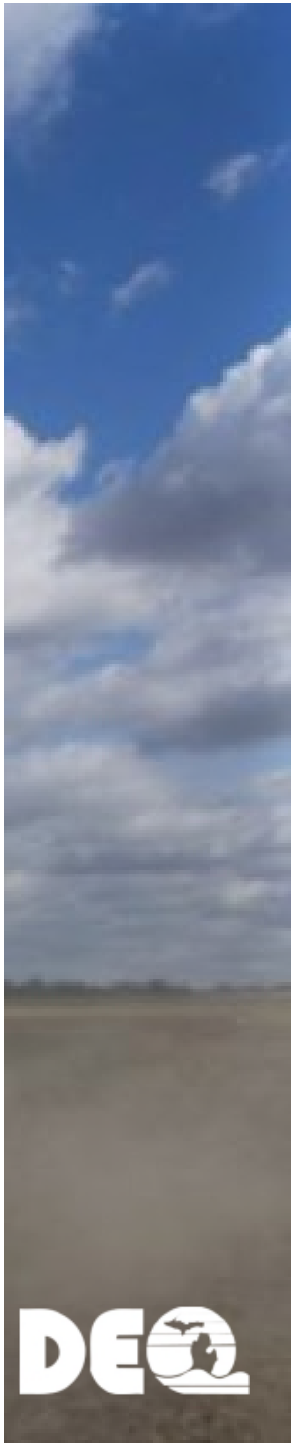
Occasional Use Areas

- ✓ Grow Groundcover
- ✓ Erect Windbreaks
- ✓ Apply Crust Chemicals

Frequent Use Areas

- ✓ Pave Roads
- ✓ Enclose Storage Areas
- ✓ Cover Storage Piles
- ✓ Water/Sweep Often
- ✓ Reduce Speed Limits
- ✓ Minimize Trips
- ✓ Limit Area Access
- ✓ Prevent Carryout Offsite

✓✓ **Use Your Checklist Daily!**



Example of a Fugitive Dust Control Plan

APPENDIX A
Fugitive Dust Control Plan

I. Plant

The drop distance at each transfer point throughout the plant shall be reduced to the minimum the equipment can achieve.

II. Truck Traffic

On-site vehicles shall be loaded to prevent their contents from dropping, leaking, blowing or otherwise escaping. This shall be accomplished by loading so that no part of the load shall come in contact within six inches of the top of any sideboard, side panel or tailgate, otherwise, the truck shall be tarped.

III. Site Roadways and the Plant Yard

(a) The dust on the site roadways and the plant yard shall be controlled by applications of water, calcium chloride or other acceptable and approved fugitive dust control compounds. Applications of dust suppressants shall be done as often as necessary to meet an opacity limit of five percent.

(b) All paved roadways and the plant yards shall be swept as needed between applications of dust suppressants.

(c) Any material spillage on roads shall be cleaned up immediately.

(d) A record of all applications of dust suppressants and roadway and the plant yard sweepings shall be kept on file for the most recent five-year period and be made available to the AQD upon request.

IV. Storage Piles

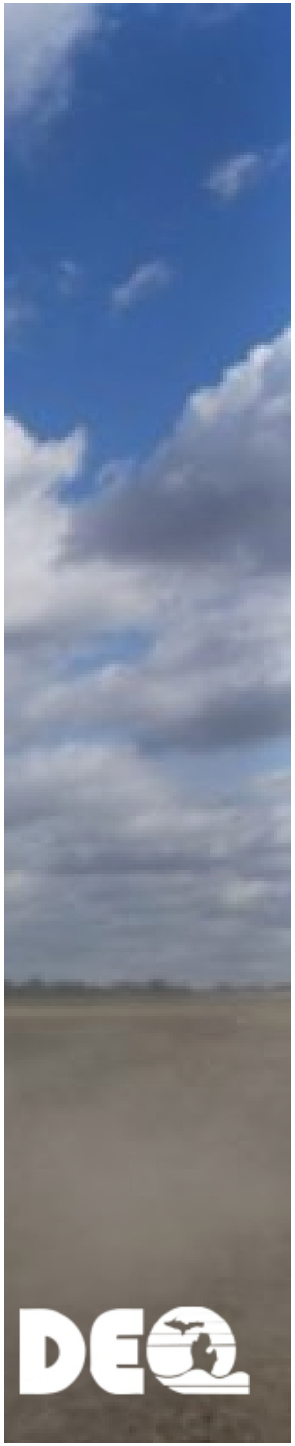
(a) Stockpiling of all nonmetallic minerals shall be performed to minimize drop distance and control potential dust problems.

(b) Stockpiles shall be watered on an as needed basis in order to meet an opacity limit of five percent. Equipment to apply water or dust suppressant shall be available at the site, or on call for use at the site, within a given operating day.

(c) A record of all watering shall be kept on file for the most recent five-year period and be made available to the AQD upon request.

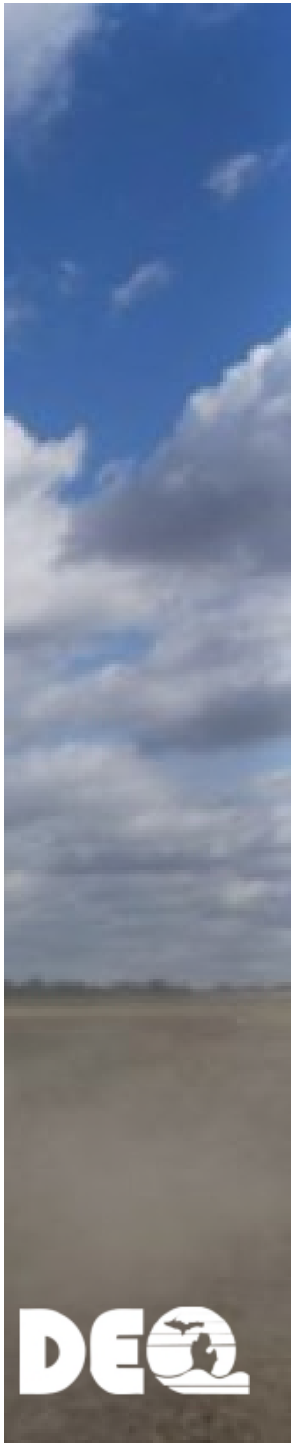
V. AQD/MDEQ Inspection

The provisions and procedures of this plan are subject to adjustment by written notification from the AQD, if following an inspection, the AQD finds the fugitive dust requirements and/or the permitted opacity limits are not being met.



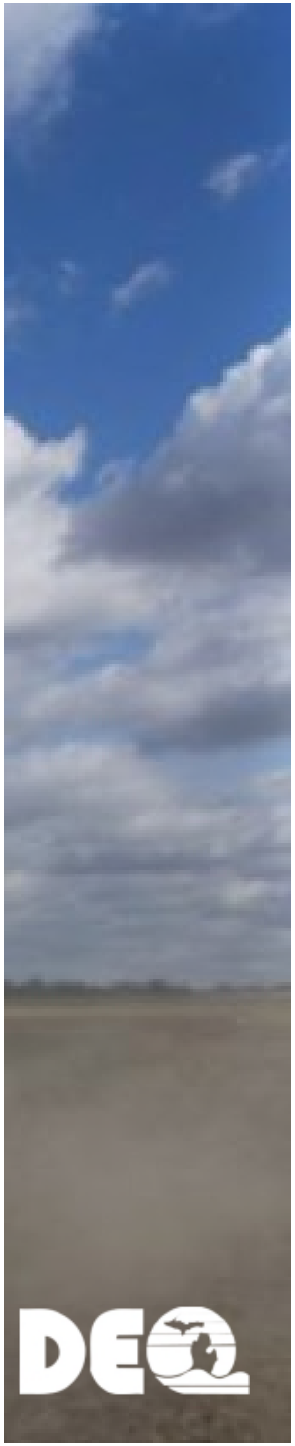
Fugitive Dust Plan Adjustments

The provision and procedures of the fugitive dust plan may be adjusted if, following an inspection, the AQD finds the fugitive dust management practices do not meet requirements and/or permitted opacity limits are not being met



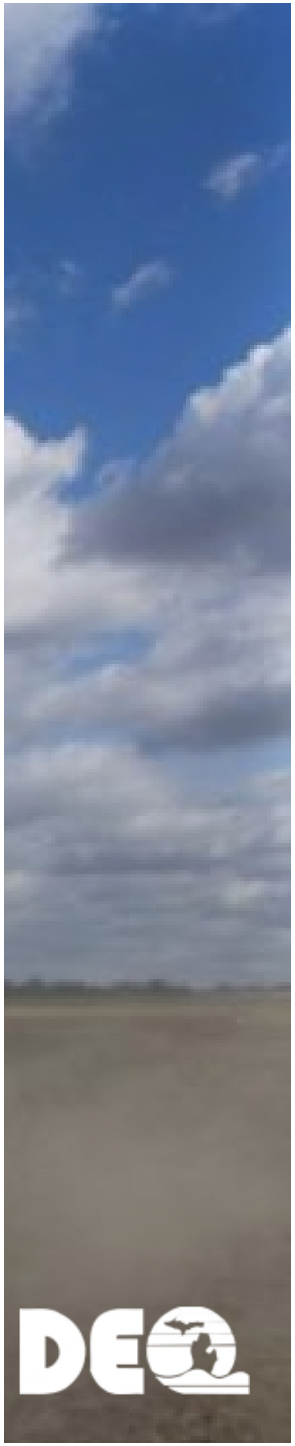
Money-saving tips to control dust from road, piles and crushing plants (NSSGA - *April 15, 2015* ***)***

1. Slow down
2. Enforce speed limits
3. Shorten Routes
4. Improve Road Structure
5. Use Road Dust Suppressants
6. Replace Tankers with sprinklers
7. Train Loader Operators in Control Measures
8. Choke feed crushers
9. Avoid Interruptions
10. Enclose Dust Sources



Final Thoughts…

- Become familiar with the applicable local, state and federal regulations.
- Design a cost-effective dust control plan implementing the least expensive control measure first, and add other measures as need it.



Final Thoughts…(Cont.)

- Conduct evaluation of the site and use good operating and engineering practices combined with proper dust suppression system.
- Be sure to address any activity that could generate dust
- Choose site specific control measures
- Training operators to take personal responsibility for minimizing dust can have a big payoff
- Document all activities for accountability


Thank
You!